Volume 41 September, 1955 *Number 9*

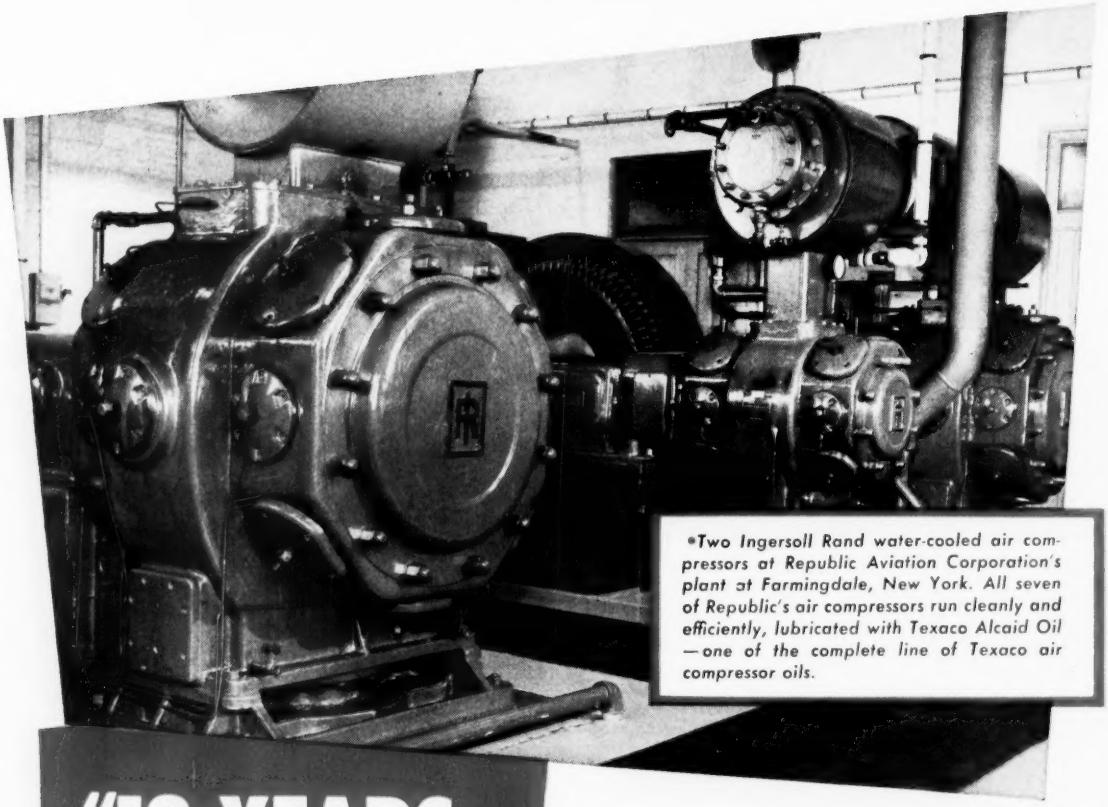
Lubrication

A Technical Publication Devoted to the Selection and Use of Lubricants

THIS ISSUE

HANDLING
OF
LUBRICANTS

PUBLISHED BY
THE TEXAS COMPANY
TEXACO PETROLEUM PRODUCTS



*Two Ingersoll Rand water-cooled air compressors at Republic Aviation Corporation's plant at Farmingdale, New York. All seven of Republic's air compressors run cleanly and efficiently, lubricated with Texaco Alcaid Oil —one of the complete line of Texaco air compressor oils.

"12 YEARS OF CLEAN, EFFICIENT OPERATION"

REPUBLIC AVIATION CORPORATION, Farmingdale, New York, uses a lot of compressed air. Mr. Arthur Kelly, in charge of compressor maintenance, reports:

"For over 12 years, all of Republic's air compressors have been Texaco-lubricated and every one of them has shown a remarkable record for clean, efficient operation. Year after year, valves and lines have stayed remarkably free of carbon deposits and our maintenance costs have been consistently low."

There is a complete line of Texaco air compressor oils. Thus, no matter what the operating conditions, no matter what the type or size of compressor, there is a Texaco air compressor oil to assure top performance.

A Texaco Lubrication Engineer will gladly help you select the proper ones for your compressors and operating conditions. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N.Y.

TEXACO

REG T.M.

TEXACO Air Compressor Oils

FOR ALL OPERATING CONDITIONS

LUBRICATION

A TECHNICAL PUBLICATION DEVOTED TO THE SELECTION AND USE OF LUBRICANTS

Published by
The Texas Company, 135 East 42nd Street, New York 17, N. Y.
Copyright 1955 by The Texas Company
Copyright under International Copyright Convention. All Rights Reserved under Pan-American Copyright Convention.

J. S. Leach, Chairman of the Board of Directors; A. C. Long, President; R. F. Baker, J. W. Foley, Executive Vice Presidents; M. Halpern, Senior Vice President; C. B. Barrett, S. C. Bartlett, T. E. Buchanan, Stanley T. Crossland, Oscar John Dorwin, E. R. Filley, Robert Fisher, F. H. Holmes, A. N. Lilley, A. M. Ottignon, J. H. Pipkin, Torrey H. Webb, J. T. Wood, Jr., J. S. Worden, Vice Presidents; W. G. Elicker, Secretary; E. C. Breeding, Comptroller.

Vol. XLI September, 1955 No. 9

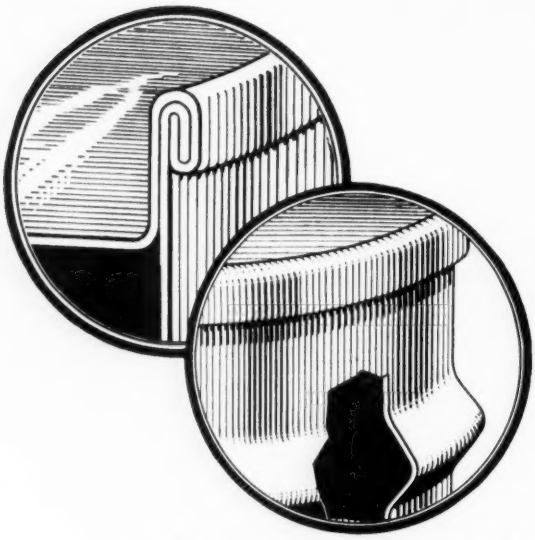
Change of Address: In reporting change of address kindly give both old and new addresses.
"The contents of 'LUBRICATION' are copyrighted and cannot be reprinted by other publications without written approval and then only provided the article is quoted exactly and credit given to THE TEXAS COMPANY."

HANDLING OF LUBRICANTS

SATISFACTORY lubrication depends upon a combination of several factors. Much has been written and said about the importance of selecting the proper lubricant and the necessity of assuring that it reaches the spot to be lubricated in the right quantity, and at the right time. In addition to these factors, however, there is one other which is certainly of equal importance but which is emphasized and stressed all too infrequently. That is the need for proper handling and storage of the lubricant so that when it is applied, it is in the same condition as when it was packaged. Little does it matter how much care is devoted to the selection of the lubricant, or how efficient and elaborate may be the arrangements for applying it, if at the moment of application, the lubricant is not in a suitable condition.

Lubrication requirements of modern machines, with their high speeds, high loads and precision fits, are becoming increasingly more severe. Consequently, increased attention must be given to all of the factors which combine to give satisfactory lubrication. The need for premium grade lubricants is rising rapidly — products which have been endowed with one or more special properties such as oxidation resistance, extreme pressure characteristics, detergency, foam resistance, rust protection, etc. Usually the improved properties characteristic of the premium grade lubricants are incorporated by the addition of small quantities of selective additives. These additives are present in a very delicate balance, and should this balance be disturbed even slightly, the intended properties of the lubricant are likely to be impaired and may even be voided entirely. Consequently, it is essential that adequate measures be taken to protect the lubricant from the time it is packaged until it is used, and even during its use. The unfortunate consequences that may result from careless and improper storage and handling are much too serious to risk. The least that could happen would be loss of the lubricant, if the condition was noticed in time and it had to be discarded. However, if contamination or any other abnormal condition was not detected before the lubricant was used, the outcome could be very serious and costly, particularly if it caused a lubrication failure on some expensive machinery.

Modern lubricants receive virtually the same care when they are refined, compounded and packaged as do foodstuffs. The supplier takes every precaution to assure that the lubricant is in the best condition possible when it is delivered to the customer. He is justly proud of the results of his efforts in this regard. The user likewise should be equally careful to make sure that the product is in good condition when it is applied. Lubricants do not require unusual care, except in the case of a few special products. However, there are certain practical rules and techniques which, if observed, will protect the lubricant from damage during storage and handling.



Courtesy of Inland Steel Container Company

Figure 1 — CLOSE-UP OF CHIME AND ROLLING HOOP

Upper left — shows how five thicknesses of steel form a chime that will stand severe handling without danger of leaking.

Lower right — these V-shaped rolling hoops do not flatten out or dent easily.

Lubricants are marketed in refinery sealed containers ranging in size from one quart or one pound up to tank car lots. Since the 55 gallon drum undoubtedly is the most representative and familiar of those employed for industrial lubricants, it will be used as the example in the discussion to follow. Handling procedures typical of those employed by the supplier will be described to emphasize the extreme care that is taken to safeguard the lubricant and assure that it reaches the customer in satisfactory condition. Suggestions also will be offered of things which the user should and should not do in order to preserve the condition of the lubricant during the interval from the time of receipt to the moment of application.

THE DRUM

Composition

The most common type of drum used for lubricants today is prepared from 18 gauge hot rolled sheet steel. Some special products or customer requirements call for a heavier drum. This is made of 14 gauge hot rolled sheet steel and is hot-dip galvanized after fabrication. This results in a heavy rust-resistant coating of zinc on the inside and outside of the drum.

Construction

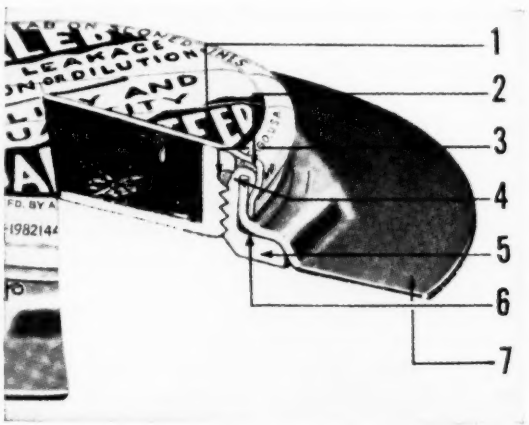
1. The body or shell of the drum is usually rolled into a cylindrical shape and at the same time two V-shaped rolling hoops are expanded from the shell. These rolling hoops strengthen the drum against collapse and project far enough to make up-ending easy. They protect the ends against damage during rolling and sometimes are used as guides when the drum is rolled along a "track". The formed body then is welded automatically down the side seam.

2. The ends are stamped separately and are permanently attached to the shell by the double seaming method. In this method five thicknesses of metal are rolled together to form a rigid and leak proof edge or chime. A rubber-like composition sealing compound is inserted in the double seam as it is formed to fill the voids left during the double seaming operation and to complete the leak proofing of the chime.

3. The flanges or threaded openings are attached during the manufacturing of the head. Normally they are made of pressed steel. Usually each drum has two flanges which are crimped into the head in such a manner that an integral assembly is obtained. Several different varieties of flanges are available but they all resist rotation, distortion and leakage.

4. The plugs or bungs are made of pressed steel or diecasting alloy and are fitted with standard 2 inch or ¾ inch pipe threads to fit the flanges. The tops of the plugs are formed in a suitable shape to take a wrench for tightening the plug in position.

5. The gaskets on each plug are of a type which resist attack or swelling when in contact with petroleum products. Generally, oil resistant synthetic rubber gaskets are used, but asbestos, cork or polyethylene are sometimes substituted.



Courtesy of American Flange and Manufacturing Company, Inc.

Figure 2 — SECTION THROUGH PLUG ASSEMBLY

1 — cap seal, 2 — cap seal gasket, 3 — plug, 4 — plug gasket, 5 — flange, 6 — flange gasket, 7 — drum head stock.

Figure 3 — DRUM RECONDITIONING EQUIPMENT

Left — infra-red drier; right — paint spray booth; foreground — inside drum wash.

6. The cap seal or tamper-proof cover on the plugs completes the drum assembly. This cap seal is made of light weight sheet metal with its own internal gasket. It is applied after the drum is filled by means of a special crimping tool in such a manner that it cannot be removed without being damaged. Although claims for the leak-proof quality of this cap seal are sometimes made, it is essentially a tamper-proof device. It is scored to assist in easy removal using either a screw driver or a pair of pliers.

Dimensions and Capacities

The usual drum size is 55 gallons net capacity, allowing for a 2% outage for safety due to expansion caused by increased temperatures. Thirty and 15 gallon drums are also used in very limited quantities. The size of the 55-gallon drum has recently been standardized by the industry so that handling and storage facilities may be uniform throughout the country. The outside diameter of the drum over the rolling hoops is 24 inches while the height is 34¾ inches. The empty drum weighs approximately 50 pounds.

Finishing Operations

Most drums today are spray painted on the outside and baked dry before being delivered for filling. This not only protects the drum from rusting but identifies, by means of the color combinations used, the petroleum company whose products it contains. The drums are continually tested during manufacture to be sure that the welded seams are correct and strong, that the chimes are leak-proof and that the flanges are applied properly. Each drum is air tested under water for leakage before it is approved by the manufacturer. It is only by these many steps mentioned above that a suitable container to handle petroleum products safely, efficiently and economically can be assured.

DRUM RECONDITIONING

Not long before the outbreak of World War II

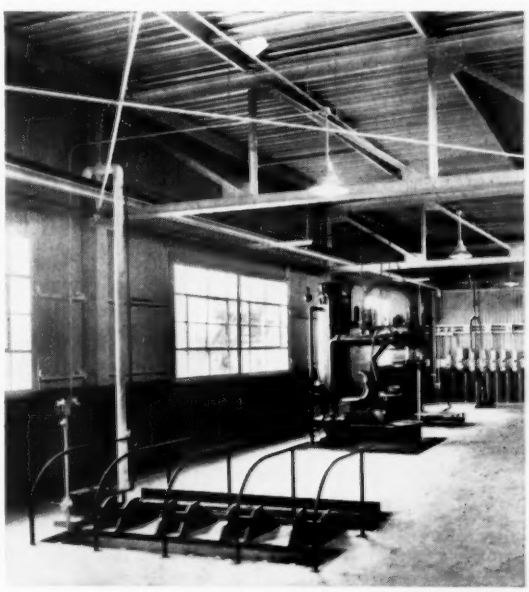


Figure 4 — Drum reconditioning equipment, showing inside drum wash, drum de-denter, chime straightener, and drum siphon.

the use of reconditioned drums for packaging lubricants was a rarity. However, the necessity of conserving metal during the war years stimulated activity in this field. The results of the efforts to develop suitable and economical techniques were so satisfactory that today reconditioned drums are employed throughout the industry. For all practical purposes, they are the equivalent of a new drum. Furthermore, a drum which is reconditioned between each use can be reused an average of eight or nine times before it has to be discarded. Since the cost of reconditioning is appreciably less than the price of a new drum, an overall saving is realized which ultimately benefits the customer.

Today the consumer usually must pay a deposit on the drum and consequently, he is fully aware that it will be reused. However, he may not know what sort of treatment the drum receives before it is refilled with lubricant. The supplier may have his own facilities for reconditioning drums, or he may send them to an outside, independent company who specialize in this work. Although the details of the reconditioning treatment vary from one company to another, the following procedure may be regarded as typical and representative of the steps that are taken to make a used drum satisfactory for reuse.

First the drums are given a superficial examination to make sure that they are in sufficiently good shape to be reconditioned satisfactorily. Then the chimes are rerolled and straightened to seal any leaks that may have developed during use. This operation is performed automatically by a machine designed especially for the purpose.

After the chimes have been rerolled and straightened, the interiors of the drums are given their first washing. The drums are inverted on the wash rack and the insides are sprayed alternately with steam and with a hot wash solution. The exact composition of this cleaning solution usually is a well-guarded secret but almost always is caustic or alkaline in nature. A constant check is maintained on the condition of the wash medium so that it is not used after it has become spent and ineffective.

Next the outside surfaces of the drums are washed to remove any loosely adhering material. The drums, still inverted, are transferred from the previous wash rack to a conveyor which carries them through the area where the outside wash is performed automatically.

The drums now are inspected again — this time for dents — and any which have indentations are set aside for a trip through the drum de-denter. This is a machine in which the drum is encased in a mold and the dents, in effect, are blown out by the instantaneous application of pressure to the inside of the drum. Generally this operation will restore all battered drums to their original shape.

Drums from the outside wash operation, plus those that have been de-dented, next are given a second inside wash. It is to this wash solution that any special ingredients may be added to protect the interior surfaces for prolonged periods against rust or corrosion. Long nozzles are inserted in the openings of the inverted drums and the solution is sprayed into the interior under pressure.

Following this second inside wash, the drums are placed right side up and are dried by suction. Then comes the very careful inspection of the interior. With the aid of an electric light which is lowered into the drum, an inspector very thoroughly and critically checks the entire interior surface. If there is *as much as a speck of rust or corrosion evident,* the drum fails to pass inspection. Those which are satisfactory are fitted with new gaskets and new or reconditioned bungs. Those which are unsatisfactory are given further treatment.

Sections of heavy chain are placed in each rejected drum, and the drums are rotated mechanically either in a horizontal or tilted position, depending upon the location of the unsatisfactory areas. Upon completion of this operation, these drums are rerouted back through the inside wash procedures.

After the interior of the drum has passed inspection, attention is then given to the outside surface. With the bungs tightly in place, the drums are fed into an enclosed area where they are blasted with steel grit. This removes all of the old paint and restores the clean, fresh metal surface.

Now the drums are all ready for the final step in the reconditioning process — the painting operation which is entirely automatic. The drums rotate and are sprayed with paint of the proper color or colors. They then are transferred on a conveyor from the painting booth to and through the drying oven. Upon emerging from the oven, the drums are fully reconditioned and ready for reuse. Before being released, the drums are tested for leaks and must pass a final inspection.

DRUM FILLING

It is not uncommon for a petroleum supplier to have his refinery geared for continuous preparation, packaging, and shipment of hundreds of different lubricants and greases. Although the details of the packaging operations will vary from place to place, they all are designed to permit a smooth, uninterrupted flow of products with chance of error reduced to an absolute minimum.

In a sense, the area in which the packaging is done is like a huge funnel. All types of lubricants and greases flow in, and they leave all packaged and ready to go to the customer. Miles of conveyor systems may be needed to handle the empty and

Courtesy of Kingsland Drum and Barrel Company, Inc.

Figure 5 — DRUM RECONDITIONING OPERATIONS

1 — straightening chimes.

2 — first inside wash.

3 — nozzles for spraying wash solution in drum.

4 — drying drum interior by suction after final wash.

5 — rotating drums containing sections of heavy chain to loosen rust.

6 — feeding drums into equipment where outside surface will be blasted with steel grit.

7 — drums in foreground have had all old paint removed — drum in background being repainted.

8 — reconditioned drums.

Figure 6 — Empty drums moving on conveyor to filling point.

Figure 7 — Drum interior about to be inspected.

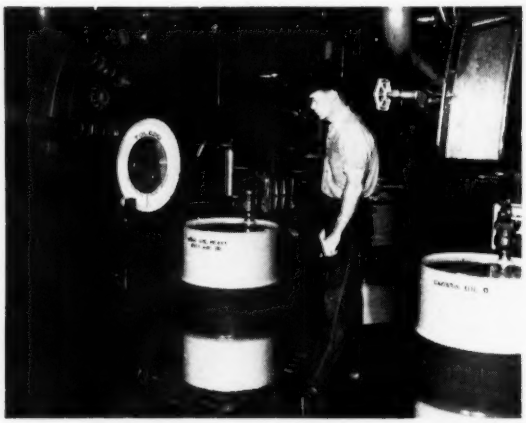


Figure 8 — Automatic drum filling equipment in operation.

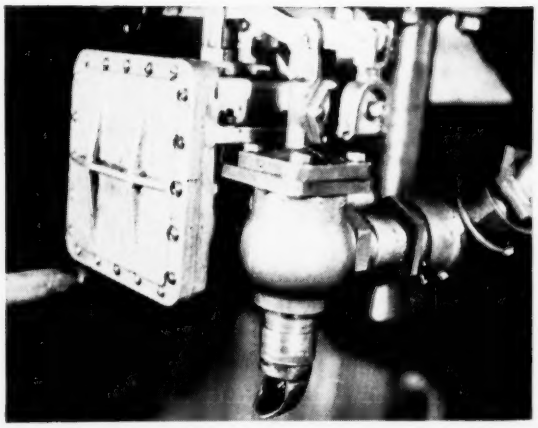


Figure 9 — Close-up of filling nozzle.

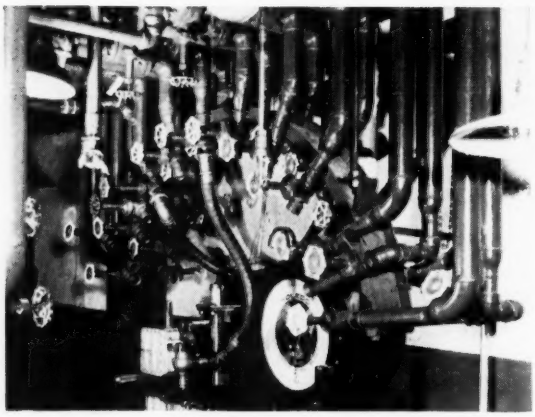


Figure 10 — Close-up of individual filling lines.

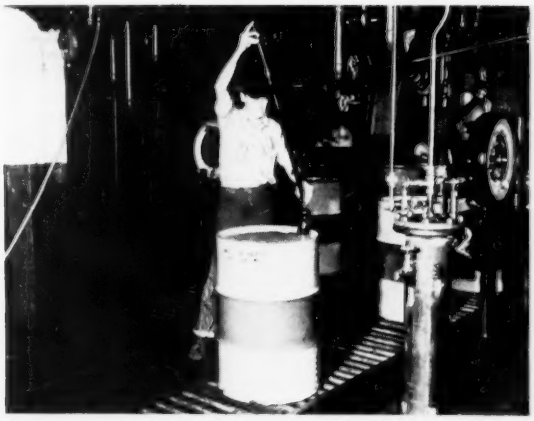


Figure 11 — Sample of lubricant being taken for examination in laboratory.

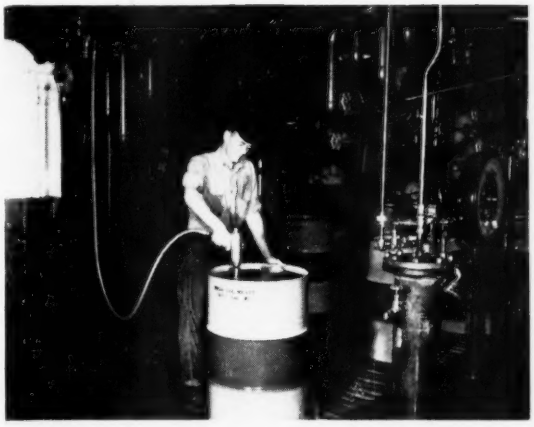


Figure 12 — Plug being tightened with air-operated wrench.

Figure 13 — Cap seal being put on with a crimping tool.

Figure 14 — Filled drums being picked up by a lift truck.

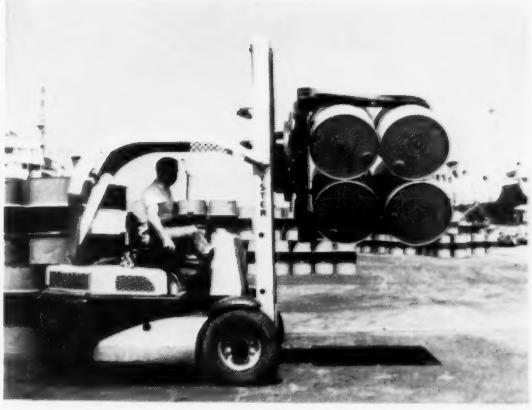


Figure 15 — Drums being transferred to a waiting truck for delivery to the consumer.

Figure 16 — With aid of lift truck, drums are stored upright on pallets. This is outdoors but the drums are under the cover of a roof.

filled containers. Elevators and all types of industrial trucks and other mechanical handling devices link the conveyor lines together in an elaborate system which makes it possible to receive empty packages, fill and ship them in one continuous operation. All activities in connection with package preparation, filling, and loading must be coordinated, scheduled, and controlled to the minute. In this respect, these series of operations are not unlike those in the assembly department of an automotive plant.

Since this is essentially a story of lubricants in drums, a typical and representative procedure for handling them by the supplier will be described and illustrated, from the time he receives them empty until he ships them out full.

All drums, both new and reconditioned, are brought to a central area and placed on a conveyor line where they begin a long trip to the filling room. Enroute, the company name and trademark, in addition to any other standard markings, are stenciled on the head of the drums. Further along, the plug is removed and the interior of the drum is inspected with the aid of a long electric light. When the drum approaches the filling area, the brand name of the product, the batch number, the filler operator's initials and the date are stenciled on the drum. Just before lubricant is allowed to flow into the drum, the interior is reinspected to be sure that it is satisfactory.

The actual filling operation using the equipment illustrated is, for the most part, automatically controlled. Numerous filling lines converge from storage tanks located in areas above the filling room to the point where the drums are filled. Each filling line is connected to *only one storage tank* and is not manifolded to two or more. Thus the only product which can enter any given line is that in the storage tank to which the line is connected. Likewise there is no manifolding at the outlet of these lines. The nozzle through which the lubricant flows into the drum is connected to the individual filling lines by a flexible hose. Since the combination of hose and nozzle is an independent unit that is connected only to one filling line at a time, there is virtually a direct line from the storage tank to the drum being filled, and only product from that tank can enter the drum.

After all of the markings have been stenciled on the drum and it has passed the final inspection, it moves along the conveyor to the point where it will be filled. The weight of the empty drum is automatically recorded, the nozzle is inserted in the opening and the operator starts the flow of lubricant. The nozzle shown has a specially designed spout which directs the stream of lubricant against the side of the drum. This reduces foaming and permits the drum to be filled at a more rapid rate. The oil feeds by gravity and when the *net weight* of the product reaches a predetermined value (based on the specific gravity of the lubricant) the flow is stopped automatically. Each drum receives the same amount of lubricant, regardless of any variation in the weight of the empty drums, and the customer is protected against being short changed due to any human error that might occur were the weighings done manually.

At this point a skeptic, while admitting that it is virtually impossible for anything to enter a drum being filled except the lubricant from the storage tank being emptied, may be concerned about what steps are taken to assure that the product itself is satisfactory. For each individual lubricating oil or grease marketed, there is a set of rigid manufacturing specifications to which each batch of product prepared must conform before it is approved. These specifications consist of numerous physical and chemical tests, the nature and scope of which depend on the type of product and kind of service for which it was designed. When a batch of lubricant is prepared, it is assigned a batch number which serves to identify it from then on. Before being transferred to an empty storage tank, samples are taken and submitted to the laboratory where the specification tests are run. In order to be approved, the product must meet *all,* not just some, of the tests that are included in the specification. In instances where a freshly prepared lubricant is transferred to a storage tank which still contains some of that same lubricant, the batch number is assigned to the composite material, and

a sample of the mixture is submitted to the laboratory for complete testing.

Before the first drum is filled, the filler operator checks the line being used, the batch number, and the product designation marked on the line and stenciled on the drum. Also there must be an approval tag at the outlet of the filler line, indicating that the product meets the manufacturing specifications. As a further check on the condition of the product, samples are taken from the first and last drum filled, as well as from certain specified intermediate drums, such as every tenth, twentieth, fiftieth, etc. These samples are rushed to the laboratory where certain key tests are conducted. The results must be available before the drums are shipped.

After the drum has been filled and sampled (if scheduled for testing) the plug is inserted and is tightened by a pneumatic or hand wrench. The degree to which the plug is tightened is very important; if insufficient, the product will leak and if too much, the gasket may be impaired and this also will lead to leakage. Finally the cap seal is installed over the plug. As mentioned previously, this is essentially a tamper-proof device, since it cannot be removed without damage.

After being filled and sealed, the drums continue along the conveyor to the areas where the loading schedules are arranged and the various orders are made up. From here on, the drums are handled very carefully, and extensive use is made of lift trucks, elevators, conveyors and other mechanical handling devices. They may be shipped directly to the customer or to some other distributing point of the supplier where they will be stored temporarily.

Up to this point, emphasis has been placed upon the efforts taken by the supplier to assure that the consumer receives the lubricant in the best possible condition. Although the details of the drum handling and filling operations vary from supplier to supplier, all of the precautionary measures discussed, with the constant checking and rechecking, are entirely typical and representative of steps taken by the petroleum industry to safeguard the quality of the lubricant until it is delivered into the hands of the user. The consumer should be equally careful to see that the product is in its original, good condition when applied.

SOME CONSEQUENCES OF IMPROPER HANDLING

Many things can happen to a lubricant between the time it is received by the customer and the moment it is applied. For example, such things as careless handling, contamination, confusion of brands, exposure to extreme temperatures, and leakage can result in damaged equipment, excessive maintenance cost, lost production, loss of lubricant, fires, and accidents.

Leakage

Loss of lubricant from damaged containers, loose fitting plugs, or careless handling (spilling) represents product that the buyer has purchased but will not be able to use. He certainly would not expect his supplier to furnish him with drums that were only partly filled. Furthermore, he would never deliberately pour a portion of lubricant down the drain. Yet the final result would be the same as when lubricant is lost through careless and improper handling — it all adds up to waste.

Also serious are the safety hazards that are created by the spilled material. A lubricant is designed to reduce friction when there is motion between two parts in contact, but not when one of the elements is the sole of a shoe and the other is the floor. Many bruises and broken bones have been caused by falls on oil-slick floors. Oil on the floor is very hazardous, particularly when the colors of the two blend so that it is almost unnoticeable. Spilled oil also creates a fire hazard, particularly in certain areas.

Thus, in the interest of both economy and safety, loss of lubricant through leakage and mishandling should be kept to an absolute minimum.

Contamination

Contamination of the lubricants with foreign material is also something to be avoided. All contamination is undesirable, but the extent of the damage that results will vary, depending upon the type of lubricant and the nature of the contaminants. In general, lubricants that contain additives will be

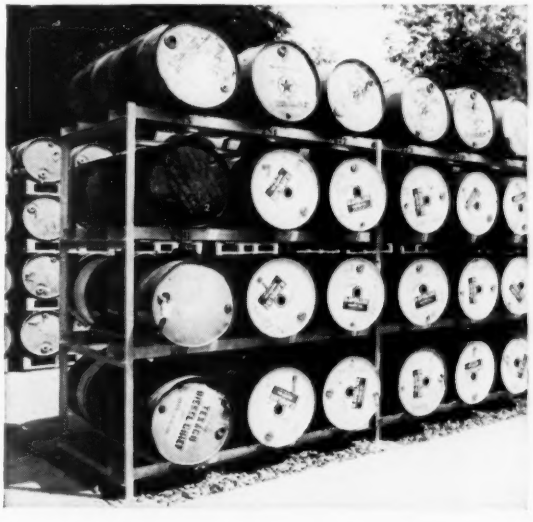


Figure 17 — If drums must be stored outdoors unprotected, this is the recommended practice. Notice that each position is numbered, and a drum may be removed from any tier without disturbing the other drums.

Figure 18 — View of suitable outdoor drum storage area.

affected more adversely than will straight mineral oils. For example, a little moisture will not result in permanent damage to straight mineral oils. They may become cloudy but will clear up after standing, as the moisture settles to the bottom. Certain additives, however, may be water sensitive, and may be removed partially or completely by contact with just traces of water. Also water will cause separation or lump formation in certain type greases.

Contamination with dirt, dust, or other solid bodies can be especially harmful if not discovered in time. Not only do these materials accelerate oil oxidation and result in a shorter oil life, but also because of their abrasive properties, they can cause serious damage to the moving parts of the machinery with which they come in contact.

Thus, contamination of the lubricant is also something that should be avoided. At best, it can cause extra handling if discovered before the lubricant is used (filtering out solid particles or allowing water to separate). Furthermore, contamination may permanently destroy some of the important properties of certain additive type lubricants—properties which are essential for satisfactory lubrication of the equipment where the product is to be used. Finally, if the contamination is not detected, some very serious consequences can result, including damaged equipment, costly repairs, and lost production.

Storage at Extreme Temperatures

Exposure of lubricants to either abnormally high or low temperatures can result in temporary or permanent damage, depending on the nature and composition of the product. Again, it is the additive type products which are most subject to harm.

Of the two temperature extremes, contact with low temperature is by far the more prevalent due to outdoor storage of lubricants in areas where the weather in winter becomes very cold. Soluble oils are examples of products that can be affected adversely by sub-freezing temperatures. These materials normally contain numerous components, including a small amout of water, all of which are present in a very delicate balance. Prolonged exposure at low temperatures may cause stratification and separation of the ingredients and destroy the properties of the product. Fortunately, most soluble oils which have been so affected can be reconstituted by agitation so as to remix the ingredients. The reconstituted product may not be as good as the original in all respects, but in most cases it will be useable. However if separation has occurred and is not discovered before the product is used, the soluble oil will be worthless, as it will not mix with water to form a satisfactory emulsion. Lubricants containing fatty materials are examples of other products that may separate upon exposure to low temperatures.

If nothing worse, lubricants and greases stored in cold areas become viscous and stiff, and in such condition they are very difficult to handle. Various means are commonly used to raise the temperature of the materials, some of which are not to be recommended. Where direct heat is applied, there is always the danger of developing local overheating which may ruin the lubricant. To use soluble oils as the example again, the loss of just a small amount of the water of composition by evaporation may cause them to jell and render them worthless. Exposure of greases to high temperatures may result in separation of the oil and soap, making them useless.

These are merely some typical examples of what may happen to lubricants when exposed to temperature extremes. In the interest of maintaining the initial properties of the products, particularly those containing additives, it is wise to protect them from excessively high or low temperatures during storage.

Confusion of Brands

To a good many people, including personnel associated with the operation of machines, oil is oil, and one is just the same as another. The properties of lubricants and the requirements of the equipment mean little or nothing to most machine operators, and upon finding their machine in need of lubricant, they may use whatever material is nearest at hand, especially if it "looks right". Obviously the chance of this occurring is slight in a plant where the handling, dispensing, and application of lubricants is centrally controlled and is supervised and administered by qualified personnel. However, this is not always the case, and the indiscriminant mixing of types and brands of lubricants does occur, sometimes with very serious consequences.

SUGGESTIONS FOR PROPER STORAGE AND HANDLING

Every plant, regardless of how large or small may be their lubricant requirements, has a problem by the mere fact that they must store and handle lubricants. Because no two plants are exactly alike and because numerous local factors must be considered, the problem is more or less specific for each individual plant. A scheme which is suitable at one place may be entirely unsatisfactory at another. However, there are some basic rules and some "do's" and "dont's" which apply to all storage and handling operations, and which should be observed. Some pertinent suggestions which may be helpful are presented as follows.

Unloading

Most lubricants are delivered to the consumer by train or truck.

(1) For easiest and simplest handling of drums, there should be an unloading platform which is level with the truck or freight car.

(2) If there is no unloading platform, use a ramp and slide drums endwise to ground level, or use a lift truck.

(3) Do not drop drums from truck or freight car to a cushion, such as rubber tires. Drum seals can be split and leakage will occur.

(4) Simple rolling of drums is satisfactory for transferring drums from unloading to storage area if distance is short.

(5) For long distance transfer, hand trucks, lift trucks or metal tracks place less strain on the seams.

Courtesy of Alemite Division, Stewart-Warner Corp.

Figure 19 — Product being transferred from original drum to smaller container by means of a transfer pump.

Storage

(1) Choose storage area carefully. Select a central location so that hauling distances are as short as possible. Also select an area where the atmosphere is free from dust and vapors.

(2) Store lubricants indoors if possible—chances of contamination will be less.

(3) If stored outdoors, drums should be placed on their side and on racks — don't lay them on the ground. When placed upright on end, rain water may accumulate and be sucked into the drum by the normal breathing action. If stored outdoors on end even temporarily, cover should be available to place over drum in the event of inclement weather.

(4) Indoor storage area, whether a separate building or whether it is a shared space, should be fire-proof, have brick, tile or concrete walls and floors, and be fitted with suitable drains. Woodwork, in addition to not being fire-proof, is more difficult to keep clean.

(5) Cleanliness is essential regardless of whether storage is indoor or outdoor. For indoor storage, area should be painted in light colors, preferably white. Maintain regular cleaning schedules.

(6) Orderliness is another must. By keeping different brands and types of lubricants separated and in their proper places, there is less chance for confusion and error.

(7) Don't store more products than necessary. The lubricant supplier will be glad to make a plant survey of lubrication requirements with a view to keeping the number of different products to a minimum. This also will reduce chances of confusion.

(8) Exercise extreme care in heating products that have been exposed to low temperatures. If possible, transfer drums to a warm area and allow product to reach room temperature. If more rapid heating is required, use exhaust steam. Never apply direct heat, such as a flame, to exterior of the drum. This would melt the sealing compound and cause leaking. It might also harm the product.

(9) Remember that exposure to temperature extremes can damage lubricants. If there is any reason to suspect that this condition has occurred, *examine the lubricant before using*. If the product appears abnormal, consult the lubricant supplier as to what to do. The lubricant may have to be discarded or it may be salvaged.

Dispensing

(1) Whether the plant be small or large, the dispensing of lubricants should be supervised by personnel who are thoroughly familiar with lubricants and lubricant requirements. This is a vulnerable link in the chain of operations that connect the source of the lubricant with its application.

(2) The actual mechanics by which the lubricant is transferred from its storage container to the point of application and the transfer equipment used will depend upon the particular plant involved. Transfer pumps are available which fit the standard grease or lubricant drum and permit the product to be removed from its original container with no danger of contamination, waste, or mess. By means of such pumps, lubricants can be transferred to smaller units such as portable power guns, hand guns, or small containers, and thence to the point of application.

Schemes can be devised for applying the lubricant directly from the drum, thus eliminating the intermediate transfer operation. For example, a drum equipped with a pump, hose, and control valve can be mounted on a dolly and brought directly to the spot where the lubricant is needed. Also a system can be devised whereby the lubricant is piped from the drum to the area where it is required, and hoses connected to the pipe outlets carry the lubricant directly to the machine.

Even for equipment which have centralized lubricating systems, arrangements can be made to transfer the lubricant directly from its original drum.

(3) All equipment used in transferring lubricants should be located in a central spot and should be kept clean.

(4) Where many different lubricants are used, a simple code system can help avoid confusion. The code, whether it be alphabetic or color (be careful of color-blindness) should be clearly evident on the drum, the transfer equipment and the point of application.

(5) Keep accurate records of the lubricants used and use old stock first.

(6) Keep the oil dispensing area clean — don't let spilled or drip oils accumulate — they are a safety hazard.

(7) Keep fire protection equipment handy.

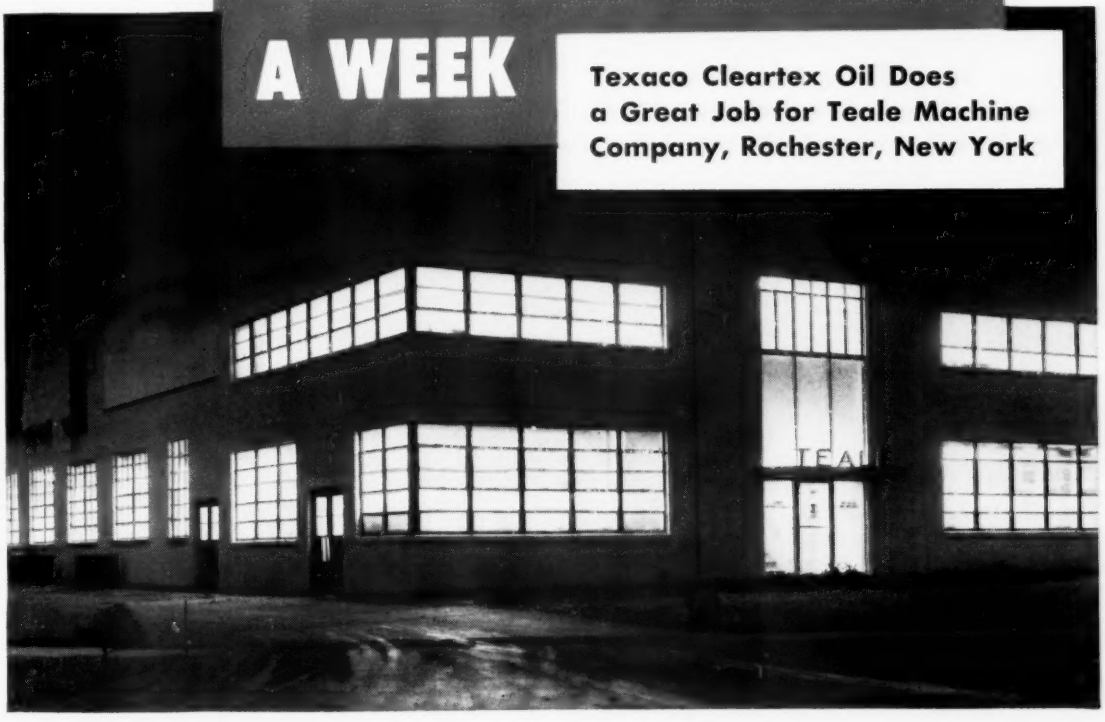
SUMMARY

The petroleum supplier takes every precaution necessary to assure that the lubricants are in the best possible condition when delivered to the customer. The user, likewise, should exercise equal care to see that when the lubricant is applied, it is in the same good condition as when it was received. Normally, lubricants are not prima donna products which require unusual care. However, there are certain things that can occur during storage and handling which lead to waste, cause safety hazards and may render the lubricant ineffective, thus resulting in lubricant failure, increased maintenance cost and lost production. It is first necessary to recognize the bad practices and then take the rather simple, precautionary measures to avoid them. With this accomplished and with qualified personnel in charge of the handling of lubricants, there is every assurance that the lubricant will be in satisfactory condition when applied.

Printed in U. S. A. by
Salley & Collins, Inc.
305 East 45th Street
New York 17, N. Y.

AROUND-THE-CLOCK OPERATION SIX DAYS A WEEK

Texaco Cleartex Oil Does a Great Job for Teale Machine Company, Rochester, New York



FOR the past five years, Teale Machine Company, Rochester, New York, has been using *Texaco Cleartex Oil AX* as machine lubricant and cutting oil. Machines run twenty-four hours a day, six days a week—cutting brass, monel, free machining and stainless steel. Results have been—

- **more pieces per tool grind**
- **better finish**
- **lower unit costs**

Better, faster machining at lower cost is the rule wherever Texaco is on the job. There is a complete line of *Texaco Cutting, Grinding, Soluble and Hydraulic Oils* to assure perfect machining of all kinds, and smooth, trouble-free performance from hydraulic equipment.

Let a Texaco Lubrication Engineer help you select the proper ones for your operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

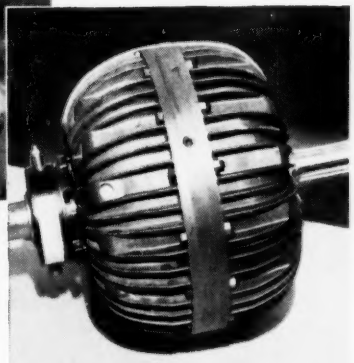
The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO CUTTING, GRINDING, SOLUBLE AND HYDRAULIC OILS

"Here's why we factory-fill our VariDRAULIC drives with Texaco Regal Oil R&O"

— says John Thomas, Chief Engineer, Thomas Hydraulic Speed Controls, Inc. Wichita, Kansas



THOMAS VariDRAULIC Drives, every one factory-filled with *Texaco Regal Oil R&O*, are also giving noteworthy performance as the variable speed link between power source and work load in heavy-duty farm machinery, industrial construction and oil field equipment.

"THIS disassembled Model SRA VariDRAULIC Drive," explains Mr. Thomas, "was installed on a wheat harvesting combine in 1949. After five years' use, harvesting wheat from Texas to North Dakota, the operator reported that the drive had never been opened, had never given a moment's trouble, and no oil had ever been added. We asked the operator to return it.

"Inspection revealed the excellent condition of the VariDRAULIC Drive and the *Texaco Regal Oil R&O*. All components looked just like new and unused parts. And the *Texaco Regal Oil R&O* itself—which had never been changed or added to—was clean and clear, despite the fact that the drive operated at times in excess of 210 degrees F., and the oil capacity of this drive is only seven quarts."

Hydraulic manufacturers and operators everywhere report similar fine results with *Texaco Regal Oil R&O*. This is the oil that tests prove has *more than ten times the oxidation-resistance* of ordinary turbine-quality oils—far superior ability to keep systems free from sludge, rust, foam and wear.

There is a complete line of *Texaco Regal Oils R&O*, approved by leading hydraulic manufacturers, for all types of hydraulic equipment. A Texaco Lubrication Engineer will gladly help you select the proper one. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

THE TEXAS COMPANY • TEXACO PRODUCTS • DIVISION OFFICES

ATLANTA, GA.....864 W. Peachtree St., N.W.
BOSTON 16, MASS......20 Providence Street
BUFFALO 9, N. Y......742 Delaware Avenue
BUTTE, MONT......220 North Alaska Street
CHICAGO 4, ILL......332 So. Michigan Avenue
DALLAS 2, TEX......311 South Akard Street
DENVER 3, COLO......1570 Grant Street
HOUSTON 2, TEX......720 San Jacinto Street
INDIANAPOLIS 1, IND., 3521 E. Michigan Street
LOS ANGELES 15, CAL.....929 South Broadway
MINNEAPOLIS 3, MINN.....1730 Clifton Place
NEW ORLEANS 16, LA......1501 Canal Street
NEW YORK 17, N. Y......205 East 42nd Street
NORFOLK 10, VA....3300 E. Princess Anne Rd.
SEATTLE 1, WASH......1511 Third Avenue

Texaco Petroleum Products are manufactured and distributed in Canada by McColl-Frontenac Oil Company Limited.